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AMF
Program
Documentation

Advanced Manufacturing Facility Proposed New Facility Requirements Program Documentation

Issued for Technical Division Peer Review
August 20, 2003



Purpose

The purposes of the program documentation herein are as follows:

- To document the locations and facilities currently utilized for the manufacturing functions described.
- To demonstrate how these functions would fit into the consolidated program for the proposed new Advanced Manufacturing Facility.
- To compare and contrast the existing facility with the proposed new facility.
- To provide a schematic floor plan for the proposed Advanced Manufacturing Facility.

Executive Summary

The Advanced Manufacturing Facility will combine several old machine shops that are currently spread out at various sites throughout Fermilab, into one centrally located, modern facility, which will lead to increases in productivity and efficiency. It will allow for more efficient operation of the present accelerator complex, provide solutions to many of the existing ES&H concerns and be adaptable to changing research requirements. This document describes that proposed facility in an overview form.

Complete information and analysis of the project justification issues can be found the project justification document, prepared by the Fermilab Technical Division.

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Existing Facilities Overview

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**Existing Facility
Overview**

Existing Facilities

The following chart lists the existing facilities to be replaced by the proposed new Advanced Manufacturing Facility.

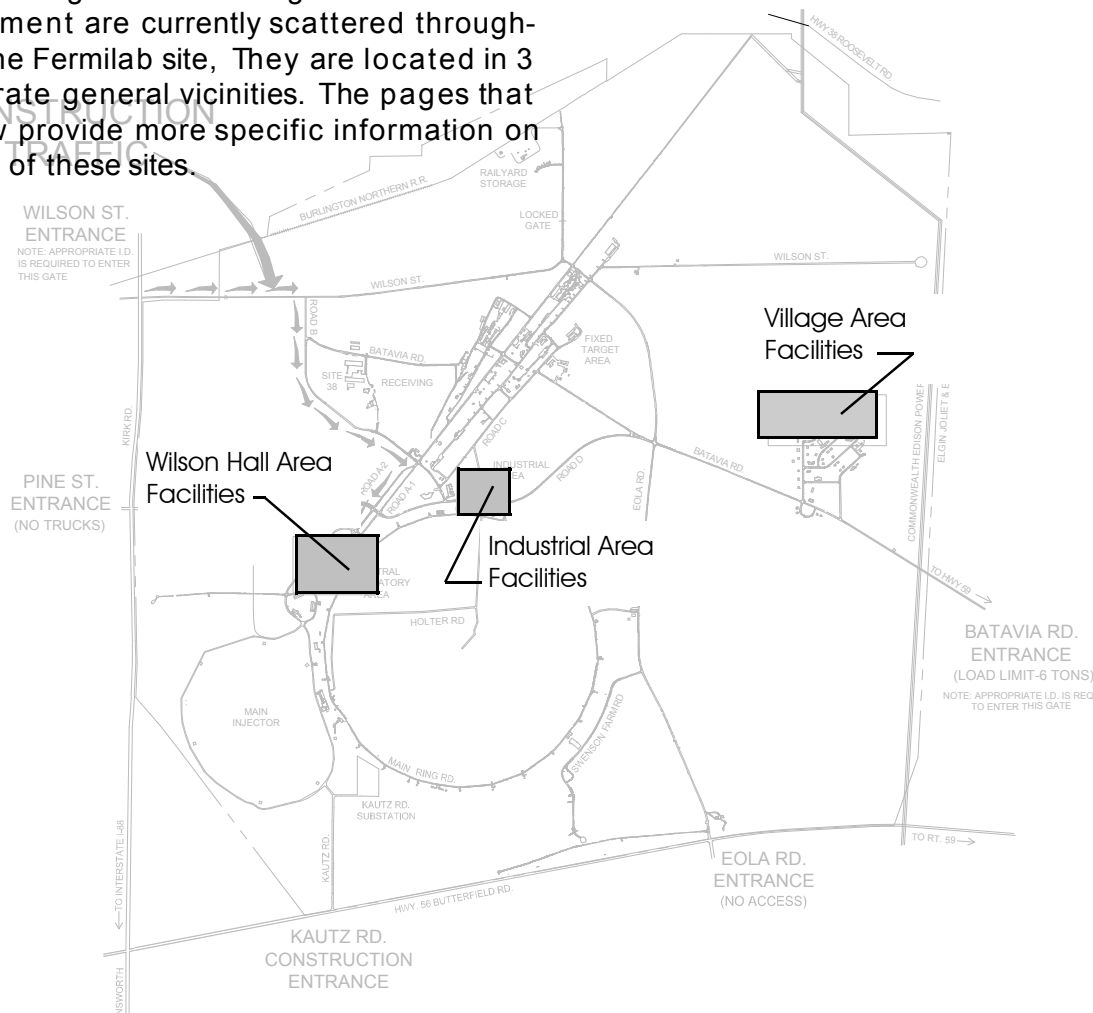
Existing Manufacturing Facilities to be replaced			
No.	Title	Existing Area (SF)	Existing Location
1	Plasma Cutting area	1,104	Building 179
2	Water Jet Area	No current Facility -New program item	
3	Cut Shop	1,922	Building 179
4	Grinding Area	770	Buildings 179 and 180
5	Machine Repair Area	4,667	Buildings 105, 109 and house A & B
6	Electron Beam Welding	448	Buildings 179 and 180
7	Assembly Area	No current Facility -New program item	
8	Weld Shop	1,000	Building 179
9	Sheet Metal Shop	1,311	Building 180
10	Large Machine area	2,800	Buildings 179 and 182
11	Lathe Area	4,000	Building no.182 (Wilson Hall Ground Floor)
12	CNC Mill Area	4,000	Building no.182 (Wilson Hall Ground Floor)
13	EZ TRAK/Bridgeport Area	2,800	Building no.182 (Wilson Hall Ground Floor)
14	Precision Machining / inspection	No current Facility -New program item	
15	Truck access	No current Facility -New program item	
16	Staging Area	No current Facility -New program item	
17	Toilet/Locker rooms (men and	400	Building 182, 109 and house A
18	Tool crib/storage area	2,710	Building 182
19	Shop office administration	1,000	House 108
20	Materials control group area	1,500	Industrial Center building
21	Outside Storage	(not in total)	Village West Lot
22	Lunch room	1,249	House A and Building 106
23	Computer room	334	Building 106
24	Conference room	143	Building 108
	Subtotal	32,158	
	Mechanical/circulation/miscella	3,859	Building 179, 180, 182, House A and B
	Total	36,017	

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Existing Facilities Overview

Existing Facilities

The existing manufacturing addressed in this document are currently scattered throughout the Fermilab site. They are located in 3 separate general vicinities. The pages that follow provide more specific information on each of these sites.



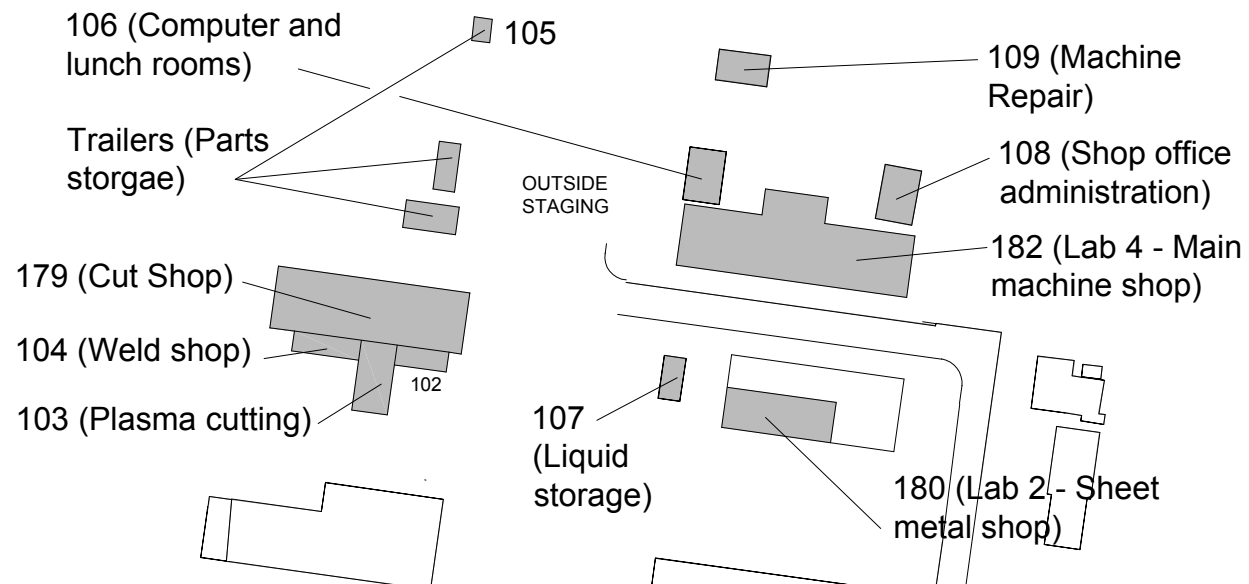
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Existing Facilities Overview

Fermilab Site

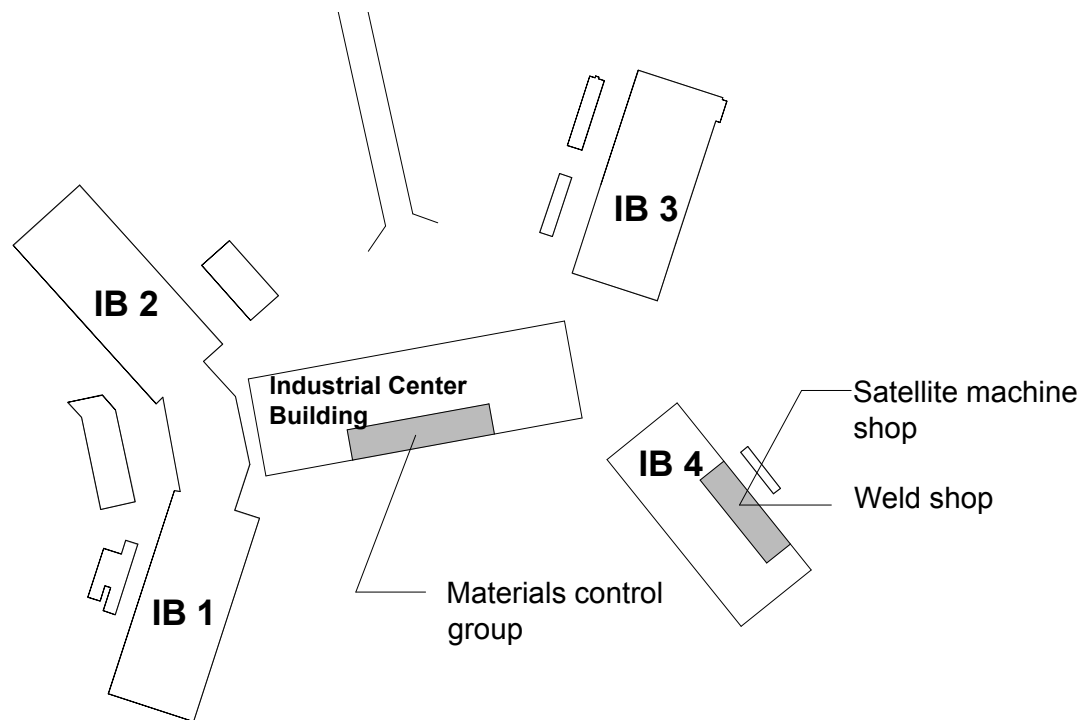
Existing Facilities Overview

Village area
Facilities



Existing Facilities
Overview

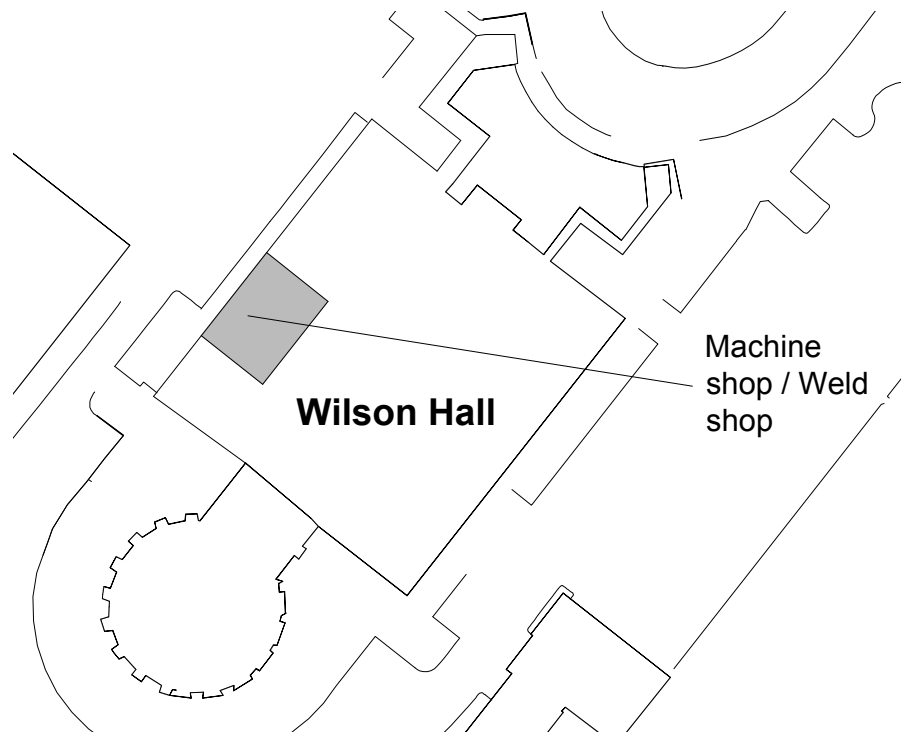
Industrial Area
Facilities



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Existing Facilities
Overview

Wilson Hall
Facilities



Proposed New Facility

Program Elements

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Proposed New
Facility

Proposed Facilities

The following chart lists the proposed elements of the new Advanced Manufacturing Faculty. Details of each item can be found on the pages

Proposed Advanced Manufacturing Facility		
No.	Title	Proposed Area (SF)
1	Plasma Cutting area	1,100
2	Water Jet Area	540
3	Cut Shop	2,750
4	Grinding Area	975
5	Machine Repair Area	4,400
6	Electron Beam Welding	850
7	Assembly Area	720
8	Weld Shop	2,160
9	Sheet Metal Shop	1,900
10	Large Machine area	2,800
11	Lathe Area	5,900
12	CNC Mill Area	6,300
13	EZ TRAK/Bridgeport Area	1,900
14	Precision Machining / inspection area	1,800
15	Truck access	1,000
16	Staging Area	1,000
17	Toilet/Locker rooms (men and women's)	600
18	Tool crib/storage area	3,150
19	Shop office administration	1,000
20	Materials control group area	1,500
21	Outside Storage	Not in total sf (13,000)
22	Lunch room	1,025
23	Computer room	360
24	Conference room	325
	Subtotal	44,055
	Mechanical/circulation/miscellaneous @ 20%	8,811
	Total	52,866

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Proposed New
Facility

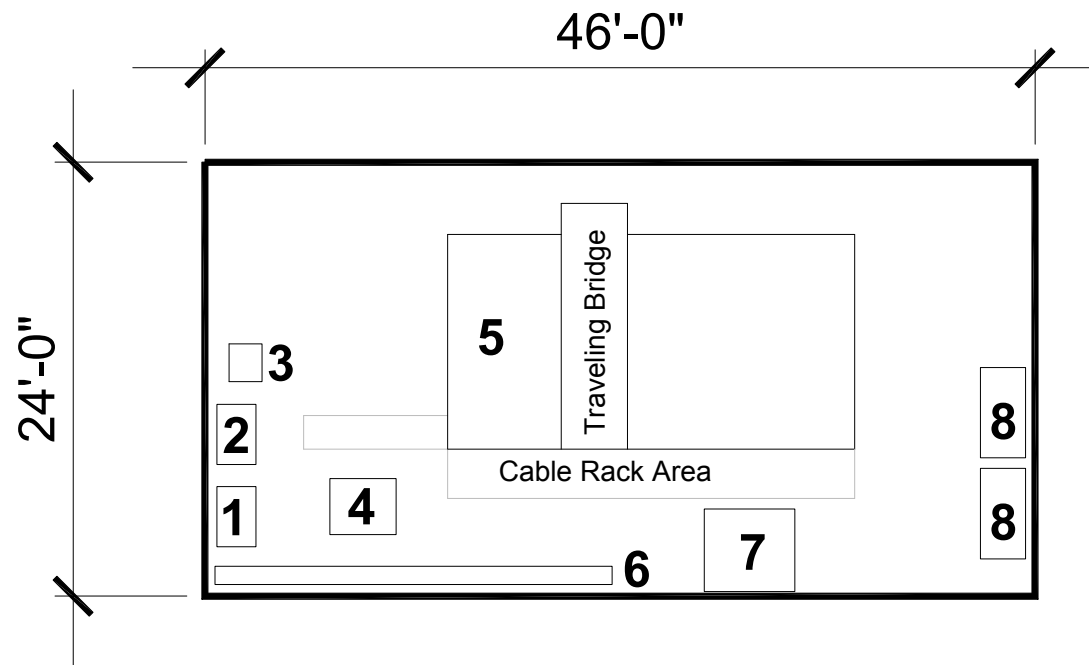
Space and Area
Overview

EQUIPMENT LIST

1. Disconnect Box (26" x 40")
2. Disconnect Box (26" x 40")
3. Transformer (22" x 25")
4. Power Supply (37" x 44")
5. Plasma Cutter (19'-3" x 36'-6", total area occupied)
6. Gas Rack (1'-0" x 22'-0")
7. Fume Extraction System (4'-7" x 6'-0")
8. Work Bench (2'-6" x 5'-0")

PROGRAM REQUIREMENTS

1. 480 V / 60 A power.
2. Area to be isolated from surrounding areas.
3. Provided separate ventilation.
4. Crane coverage required.
5. Fume Extraction System attached to wall.
6. Potable water.
7. Air Line.



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Proposed New
Facility

1
Plasma Cutting
Area
1,100 sf

PROGRAM REQUIREMENTS

1. Area to be isolated from surrounding areas.
2. Provided separate ventilation.
3. Crane coverage required.
4. Provide slurry processing equipment area in an enclosure adjacent to room but in outside staging area.
5. Water and air required

THE SPECIFIC PLAN AND EQUIPMENT LAYOUT OF THIS AREA WILL BE DEVELOPED DURING THE BUILDING DESIGN PHASE. THE SIZE OF THIS BLOCK INDICATES THE AREA REQUIRED FOR THESE FUNCTIONS.

36'-0"

15'-0"

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Proposed New
Facility

2

Water Jet
Area
540 sf

EQUIPMENT LIST

- 1 DoAll Plate Saw (10' x 13'-6")
- 2 Amada (6' x 14'-4")
- 3 Marvel (3'-6" x 7'-3")
- 4 Cold Saw (2' x 3')
- 5 Table Saw (2'-6" x 6')
- 6 Shear
- 7 Desk
- 8 DoAll Vertical Band Saw (4' x 6'-6")
- 9 Wells Saw (2'-6" x 6'-4")
- 10 Bar Stock rack
- 11 Rack
- 12 Records (15" x 29")
- 13 Bench Vise Table (30" x 60")

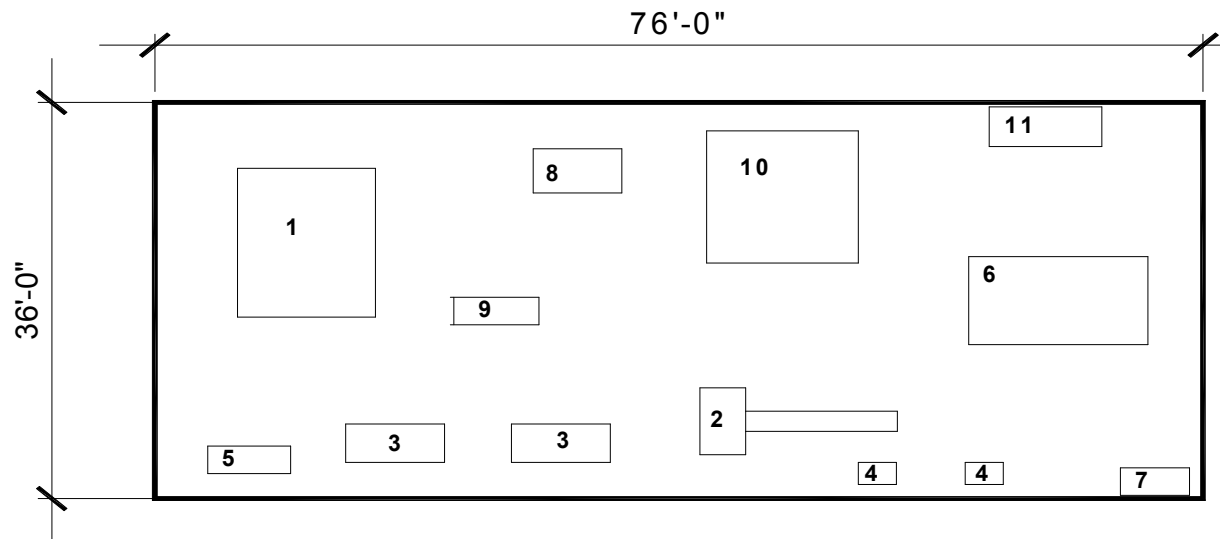
PROGRAM REQUIREMENTS

1. 480 V / 30 A power
2. Crane coverage required..
3. Compressed air

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Proposed New
Facility



3

Cut Shop
2,750 sf

EQUIPMENT LIST

- 1 Blanchard (5' x 10')
- 2 Okahamato Surface Grinder (9' x 7')
- 3 Mattison Surface Grinder (8' x 21')
- 4 Boyer Schultz Surface Grinder (5' x 4')

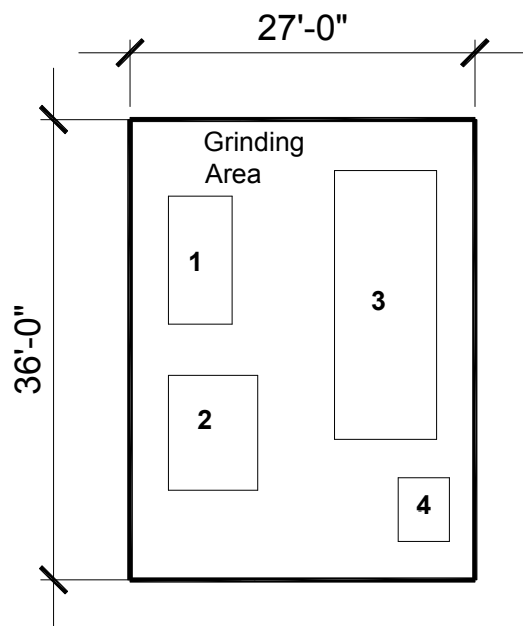
PROGRAM REQUIREMENTS

1. 480 V / 60 A power
2. Area to be isolated from surrounding areas.
3. Provided separate ventilation.
4. Can be in low bay with no crane coverage.

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Proposed New
Facility



4

Grinding Area
975 sf

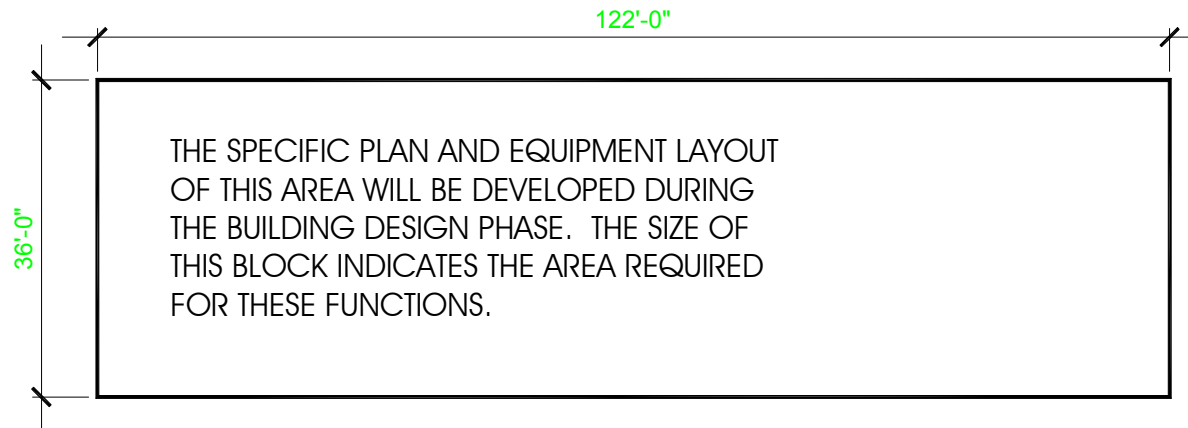
PROGRAM REQUIREMENTS

1. 480 V / 60 A power.
2. Nearby machine rooms, but not necessarily adjacent.
3. Partial crane coverage (50%).

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Proposed New
Facility



5

Machine Repair
Area
4,400 sf

PROGRAM REQUIREMENTS

1. 480V / 30A power.
2. Area to be isolated from surrounding areas (enclosed area).
3. Provided separate ventilation.
4. Can be in low bay with no crane coverage.
5. 8'-0" access door required.

23'-0"

37'-0"

THE SPECIFIC PLAN AND EQUIPMENT LAYOUT OF THIS AREA WILL BE DEVELOPED DURING THE BUILDING DESIGN PHASE. THE SIZE OF THIS BLOCK INDICATES THE AREA REQUIRED FOR THESE FUNCTIONS.

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Proposed New
Facility

6

Electron Beam
Welding
850 sf

PROGRAM REQUIREMENTS

1. Crane coverage required.
2. Finished items from this space will go to outside storage or directly to customer.

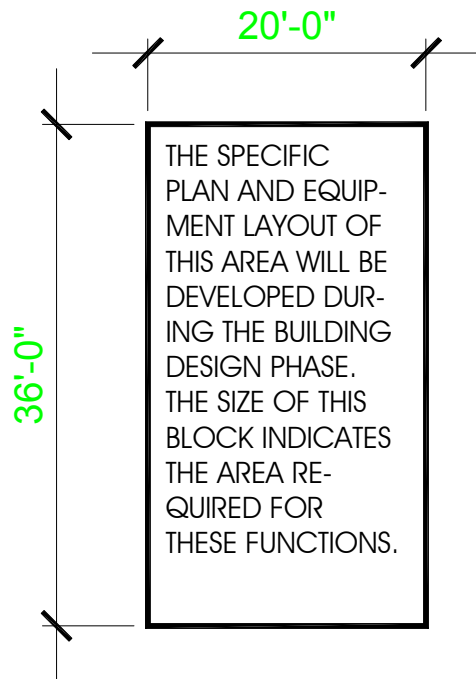
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Proposed New
Facility

7

Assembly
Area
720 sf

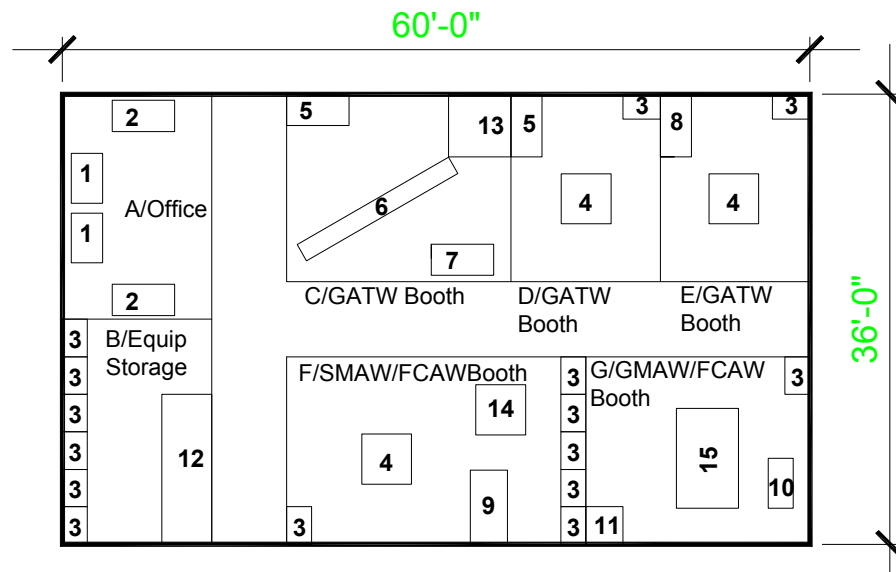


EQUIPMENT LIST

- 1 Computer Desk (30" x 48")
- 2 Office Desk (36" x 60")
- 3 Storage Cabinet (24" x 36")
- 4 Welding Table (48" x 48")
- 5 Dynasty Welding Machine (30" x 60")
- 6 Welding Table (18" x 14')
- 7 Magna Tech Pipe Welding Machine (30" x 60")
- 8 Synowave Welding Machine (30" x 60")
- 9 Linde Welding Machine (36" x 72")
- 10 GMAW Welding Machine (24" x 48")
- 11 Plasma Arc Welding Machine (36" x 36")
- 12 Cylinder storage (48" x 12')
- 13 Wall Mounted Nederman Internal Exhaust (60" x 60")
- 14 Nerman Portable Fume Exhaust (48" x 48")
- 15 External Exhaust Welding Table (60" x 96")

PROGRAM REQUIREMENTS

1. 480V / 60A power.
2. Area to be isolated from surrounding areas.
3. Provided separate ventilation.
4. Locate in high bay with crane coverage.
5. 60 amp welding receptacle for each welding booth
6. G requires 16" diam external exhaust at welding table
7. All welding booths constructed of UV welding curtain.



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Proposed New
Facility

8
Weld Shop
2,160 sf

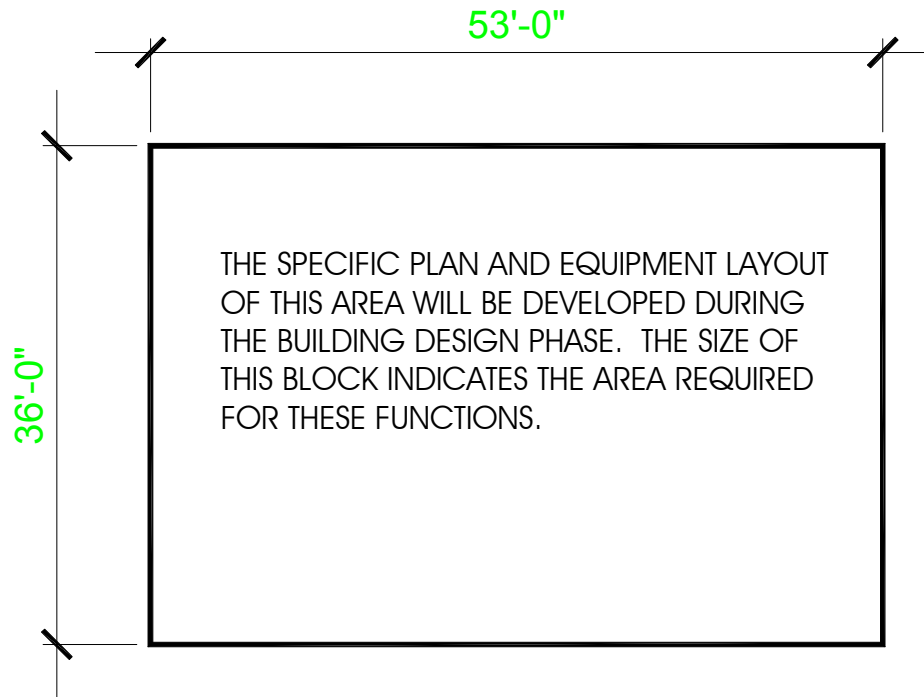
PROGRAM REQUIREMENTS

1. 480V / 60A power.
2. Locate in high bay with crane coverage.

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Proposed New
Facility



THE SPECIFIC PLAN AND EQUIPMENT LAYOUT OF THIS AREA WILL BE DEVELOPED DURING THE BUILDING DESIGN PHASE. THE SIZE OF THIS BLOCK INDICATES THE AREA REQUIRED FOR THESE FUNCTIONS.

9

Sheet Metal
Shop
1,900 sf

EQUIPMENT LIST

1

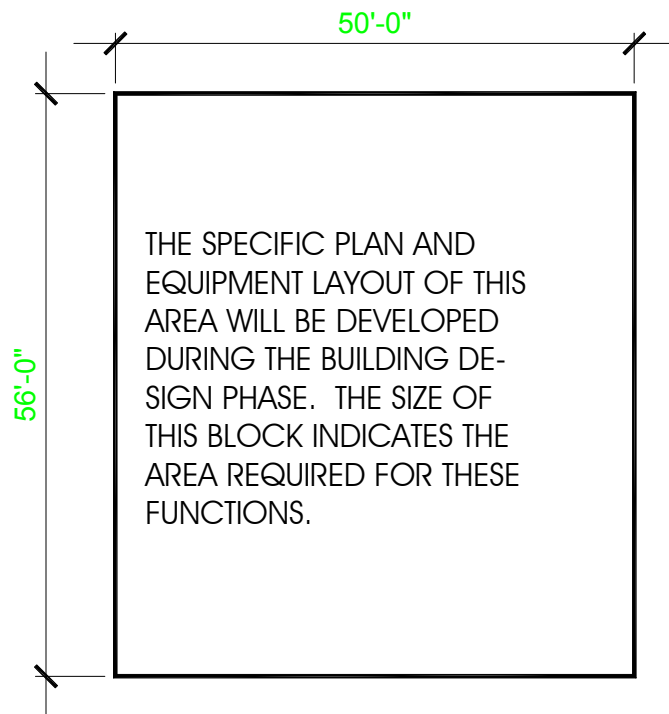
PROGRAM REQUIREMENTS

1. 480V / 60A power.
2. Locate in high bay with crane coverage.

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Proposed New
Facility



10

Large Machine
Area
2,800 sf

EQUIPMENT LIST

- 1 Hardinge
- 2 Lodge & Shipley (4' x 11')
- 3 LeBlonde (5' x 13')
- 4 Monarch (4' x 13')
- 5 Harrison (4' x 10')
- 6 Sidney (5' x 8')
- 7 Mazak CNC 5' x 15')
- 8 SNK CNC (10' x 15')
- 9 Romi EZ Path
- 10 Clausing Colchester (6' x 10')
- 11 Lucas CNC Mill (22' x 24')
- 12 Hollow Spindle Lathe
- 13 Large Monarch Lathe
- 14 12' Planer
- 15 Work Benches (2'-6" x 5'-0) , 15 required

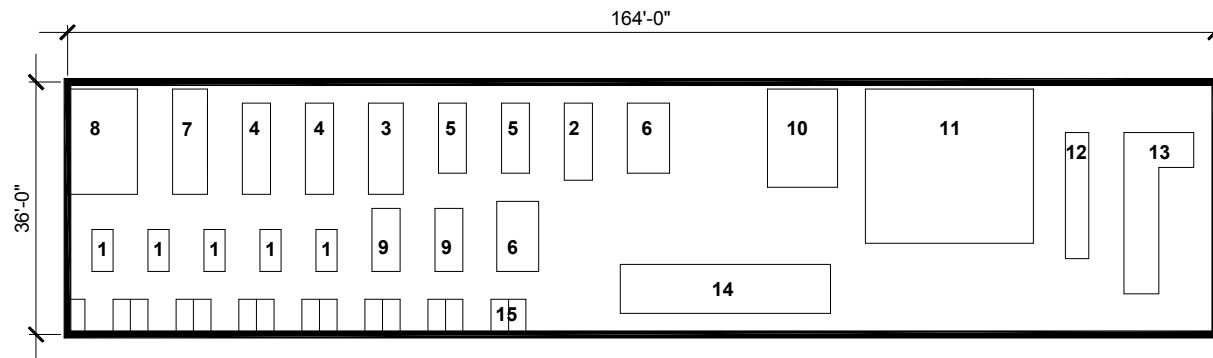
PROGRAM REQUIREMENTS

1. 480 V / 30 A power
2. Separate ventilation required
3. Locate in high bay with crane coverage.

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11

Lathe /Work Bench
Area
5,900 sf

EQUIPMENT LIST

- 1 MAHO 5 axis CNC (11' x 11')
- 2 4B-60 DeVlieg Jigmill (14' x 13')
- 3 3B-48 DeVlieg Jigmill (14' x 13')
- 4 HAAS VF-OE CNC Machining Center (10' x 12')
- 5 HAAS VF- 9 CNC Machining Center (proposed) 12' x 16')
- 6 Kitamura CNC Machining Center (13' x 14')
- 7 DeVlieg CNC Mill (20' x 17')
- 8 5" G&L Bar "Queen" (25' x 35')

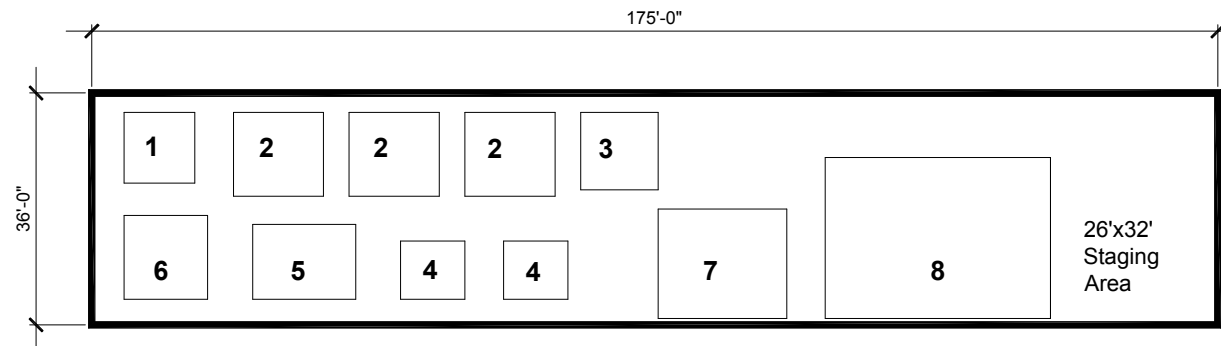
PROGRAM REQUIREMENTS

1. 480 V / 30 A power
2. Locate in high bay with crane coverage.

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Proposed New
Facility



12

CNC Mill
DeVlieg Area
6,300 sf

EQUIPMENT LIST

- 1 EZ Trak Mill (6' x 6')
- 2 Standard Bridgeport Mill (6'x 6')
- 3 Mill Table (25" x 33")
- 4 Work Bench (30" x 60")

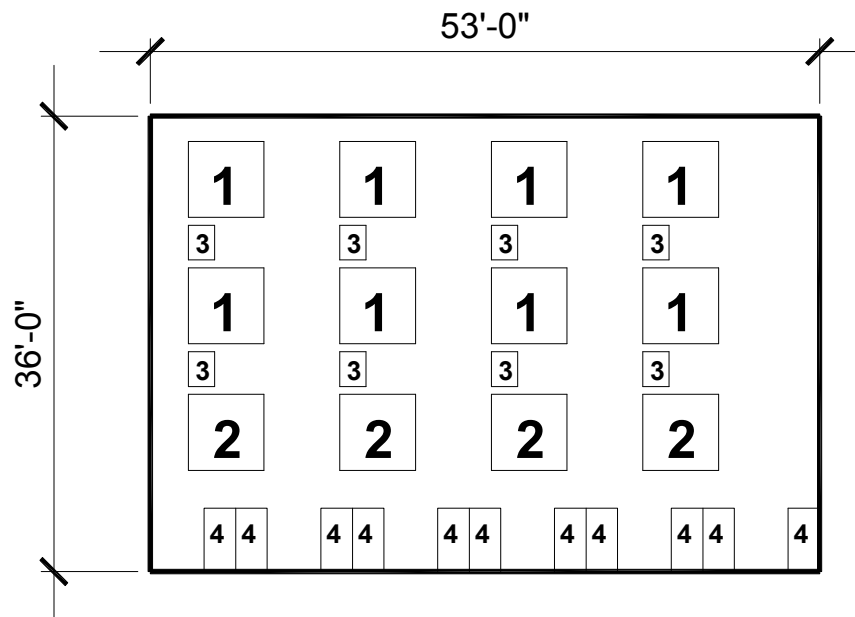
PROGRAM REQUIREMENTS

- 1. 480 V / 30 A power
- 2. Locate in high bay with crane coverage.

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13

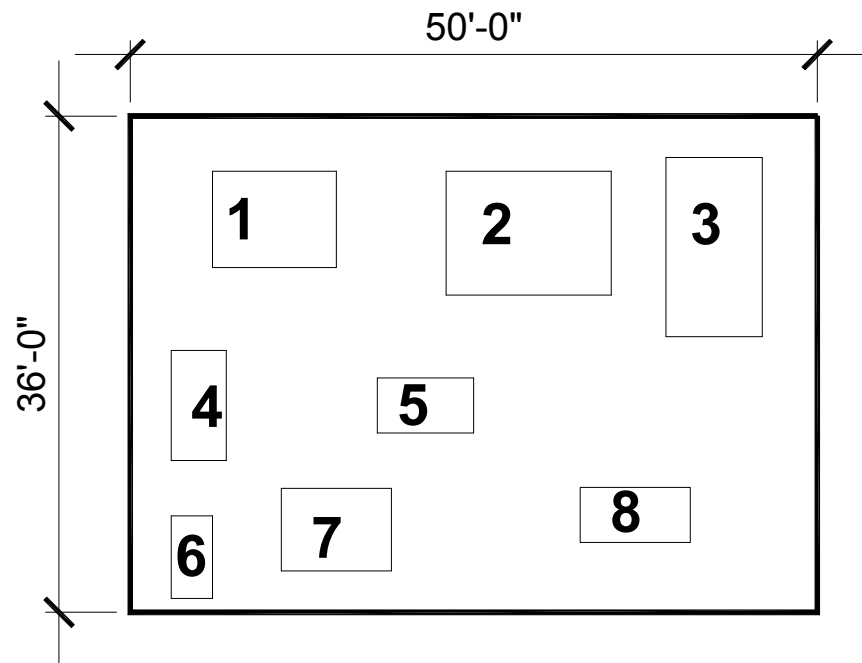
EZ TRAK
Bridgeport Area
1,900 sf

EQUIPMENT LIST

- 1 Machining Center (7'-6" x 9'-0")
- 2 Wire EDM Machine (9'-0" x 12'-0")
- 3 Wire EDM Machine (7'-0" x 13'-0")
- 4 Precision CNC Lathe (4'-0" x 8'-0")
- 5 Surface Plate (4' x 6')
- 6 Comparator (3'-0" x 6'-0")
- 7 CMM Area (6'-x 8')
- 8 Surface Planer (4'-0" x 8'-0")

PROGRAM REQUIREMENTS

1. Can be in low bay with no crane coverage.
2. Temperature control required to maintain minimum temperature variation.
3. Area to be isolated from surrounding areas.
4. Provided separate ventilation.
5. Controlled 10'-0" access door.
6. Space to have its own internal crane.
7. Compressed air.



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14

Precision Machine
Inspection Area
1,800 sf

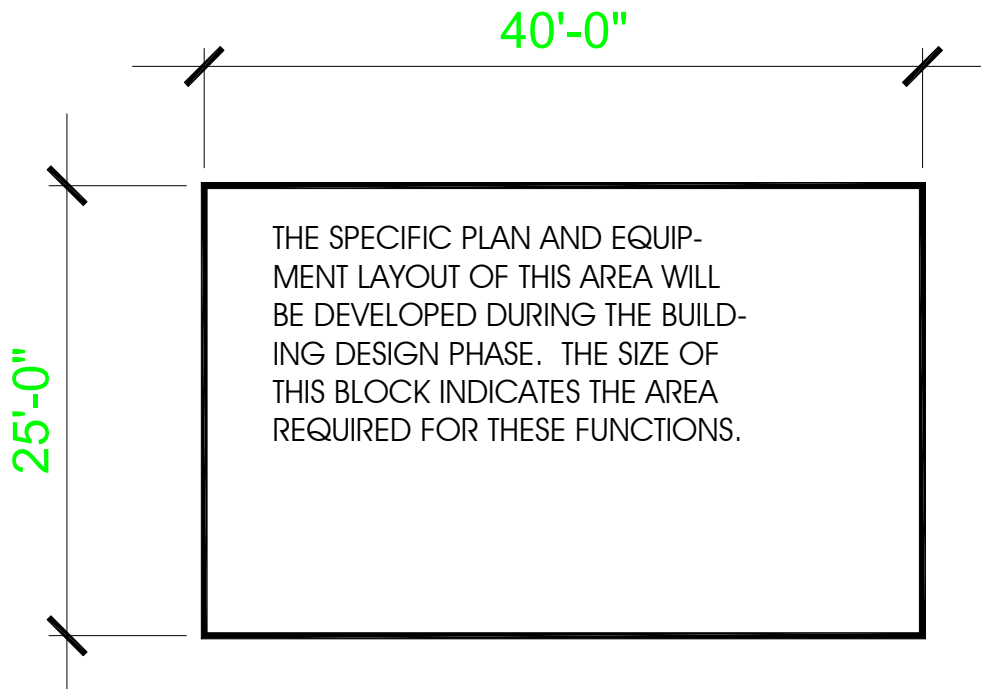
PROGRAM REQUIREMENTS

1. 16'-0" roll up door.
2. Crane coverage required.

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15

Truck Access
Area
1,000 sf

PROGRAM REQUIREMENTS

1. Crane coverage required.
2. Directly accessible to truck access.

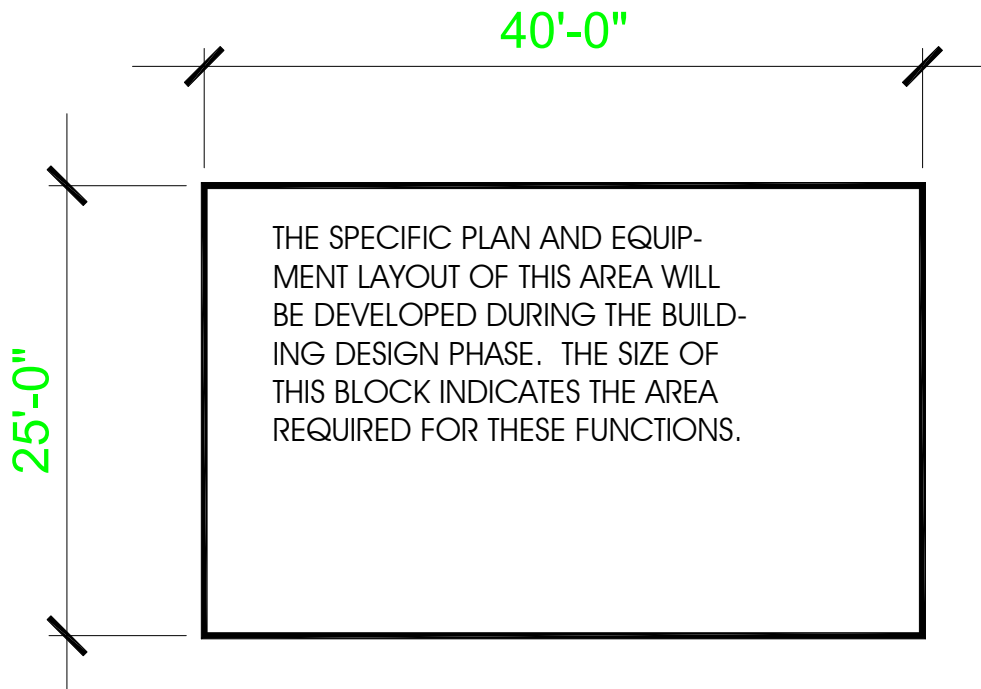
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Proposed New
Facility

16

Staging
Area
1,000 sf



PROGRAM REQUIREMENTS

1. Accommodate 25 men
2. Accommodate 4 women

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Proposed New
Facility

17

Toilet / Locker
Facilities
600 sf

25'-0"

24'-0"

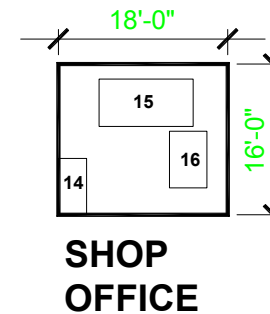
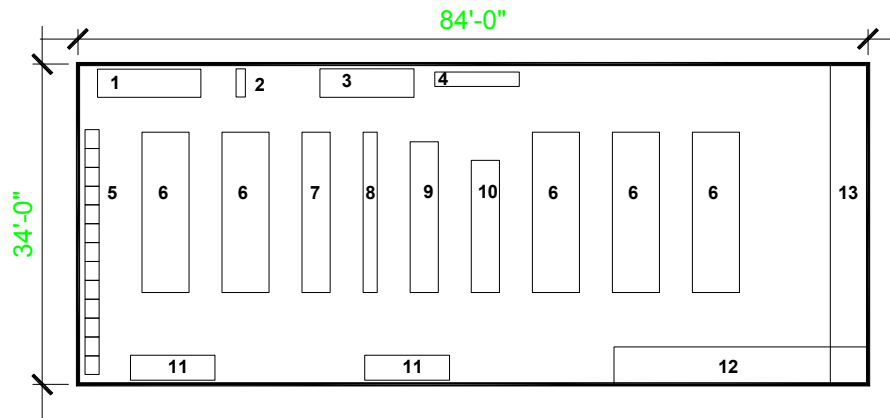
THE SPECIFIC PLAN AND
EQUIPMENT LAYOUT OF THIS
AREA WILL BE DEVELOPED
DURING THE BUILDING DE-
SIGN PHASE. THE SIZE OF THIS
BLOCK INDICATES THE AREA
REQUIRED FOR THESE FUNC-
TIONS.

EQUIPMENT LIST

- 1 Desk (3' x 11')
- 2 Clamp Rack
- 3 Coolant Storage (3' x 10')
- 4 Grinding Wheels (1'-6" x 19')
- 5 Shelving Unit (13 @18" x 24")
- 6 Tool Cabinet (5 @ 5' x 17')
- 7 Tool Cabinet (3' x 17')
- 8 Rack (1'-6" x 17')
- 9 Shelves (3' x 16')
- 10 Cabinets (3' x 14')
- 11 Cabinets (32" x 9')
- 12 Racks (4' x 27')
- 13 Racks (4' x 34')
- 14 Alt. Compressor (3' x 6')
- 15 Compressor (5' x 10')
- 16 Air Dryer (4' x 6')

PROGRAM REQUIREMENTS

1. Accessed most from the weld shop processing areas.
2. Gated secured area
3. Service window
4. Shop office adjacent to tool crib/storage.
5. 8'-0" OH door to outside storage (forklift accessible)
6. Shop office to accommodate 2 people.
7. 480V 30 amp power



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Proposed New Facility

18
Tool Crib / Storage
Area / Shop Office
3,150 sf

PROGRAM REQUIREMENTS

1. Accommodate 8 people
2. Secretarial area for 5 (approx. 12' x 38'.
3. 3 private offices (@ 10' x 12' each)

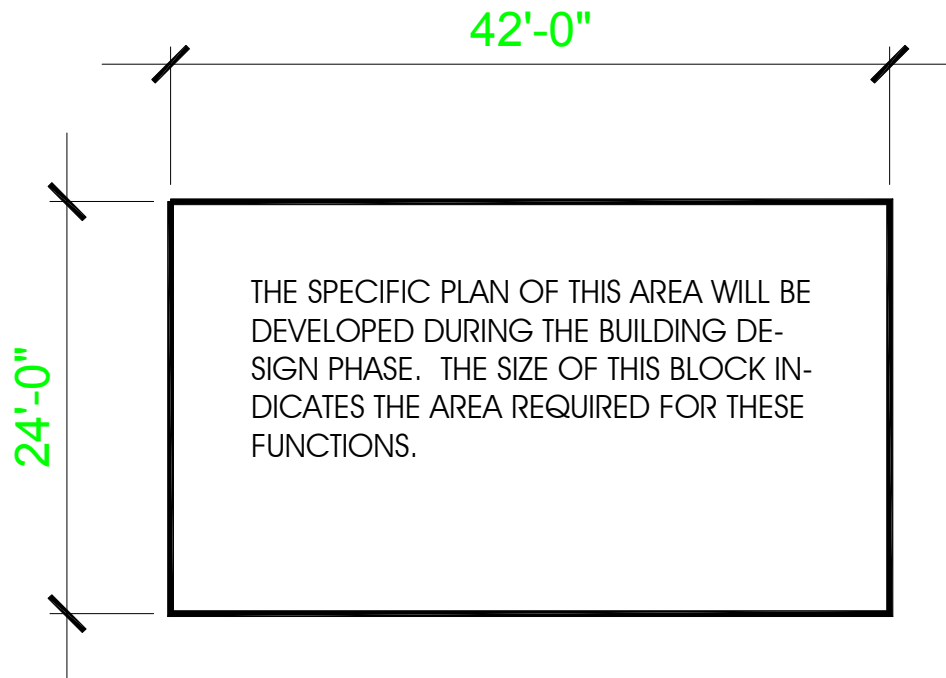
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Proposed New
Facility

19

Shop Office
Administration
1,000 sf



PROGRAM REQUIREMENTS

1. Accommodate 6 people
2. Secretarial area for 5 (approx. 10' x 30'.
3. 1 private office (@ 10' x 12' each)
4. File storage
5. 1 open office (@ 10' x 12' each)
6. 1 private office (@13' x 20') for department head.

63'-0"

24'-0"

THE SPECIFIC PLAN OF THIS AREA WILL BE DEVELOPED DURING THE BUILDING DESIGN PHASE. THE SIZE OF THIS BLOCK INDICATES THE AREA REQUIRED FOR THESE FUNCTIONS.

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Proposed New
Facility

20

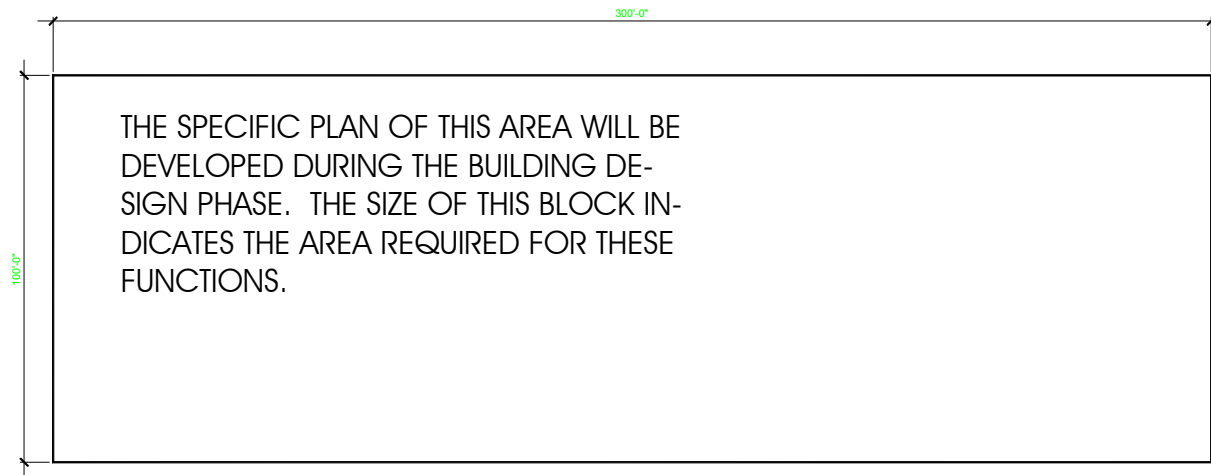
Materials Control
Group
1,500 sf

PROGRAM REQUIREMENTS

1. Fenced, paved area with lighting.
2. Includes compression building with heat and ventilation
3. Heated containment area for lube, oil and coolant, compressed gas and bottle storage.

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Proposed New
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21
Outside storage
Area
13,000

PROGRAM REQUIREMENTS

1. To accommodate 25 people.
2. To double as training room
3. Provide modular table system.

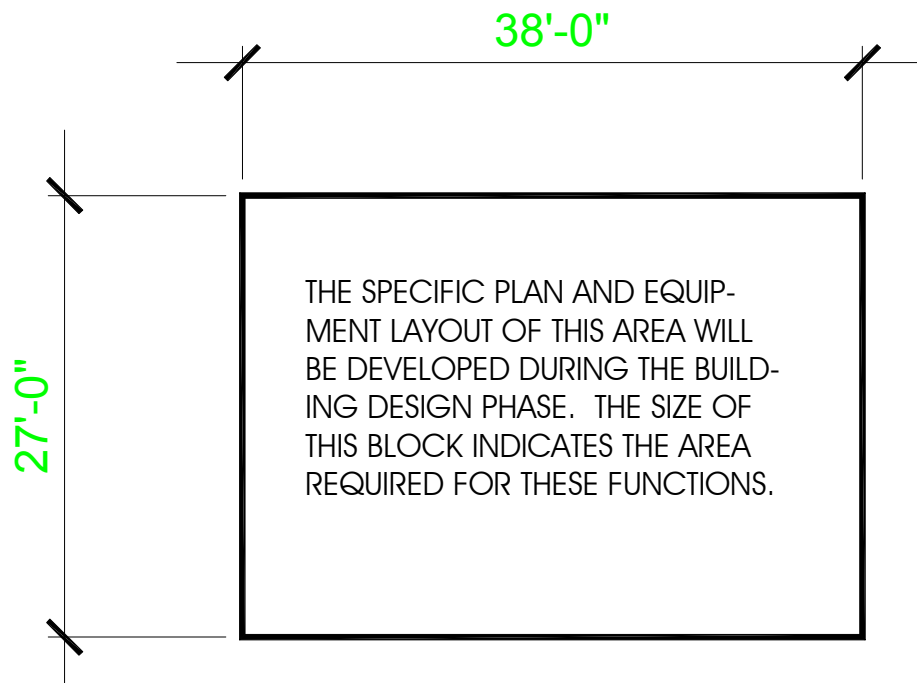
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22

Lunch
Room
1,025



PROGRAM REQUIREMENTS

1. To accommodate computer equipment
2. To accommodate 2 to 4 people.

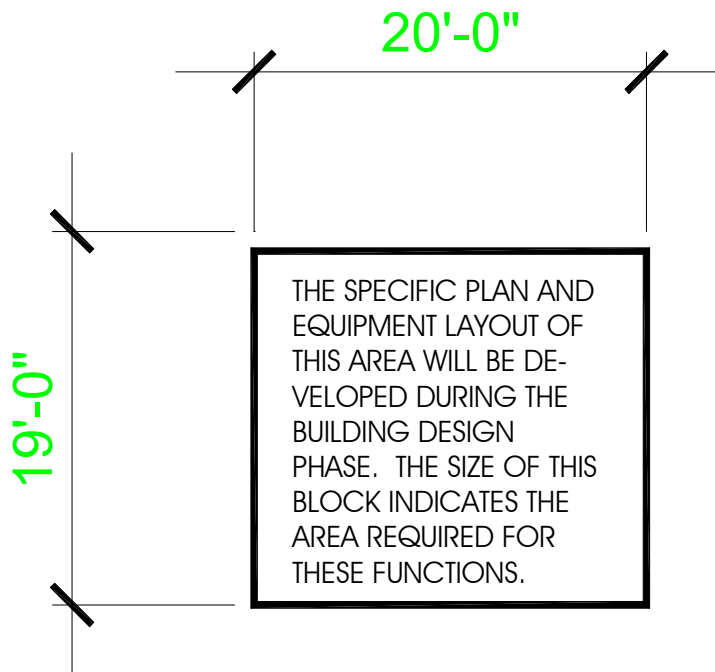
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23

Computer
Room
360



EQUIPMENT LIST

1

PROGRAM REQUIREMENTS

1. To accommodate 15 people.
2. Tele—Video capability

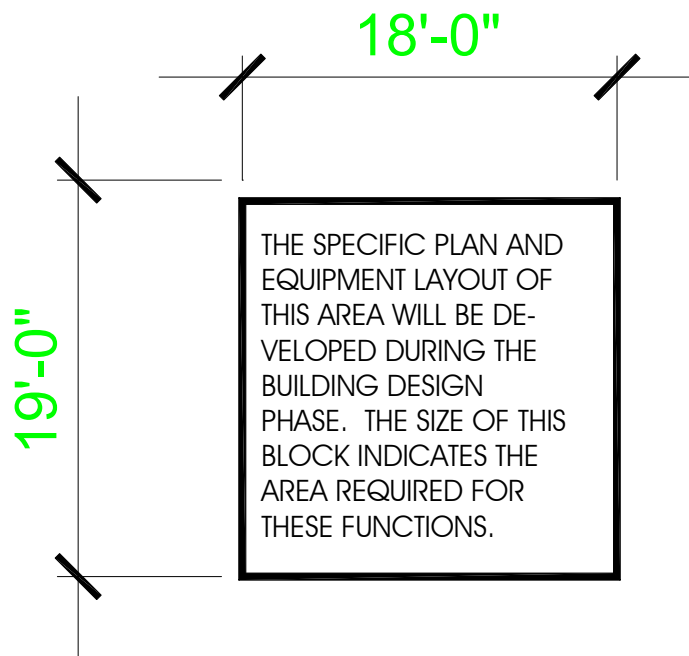
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24

Conference
Room
325 sf



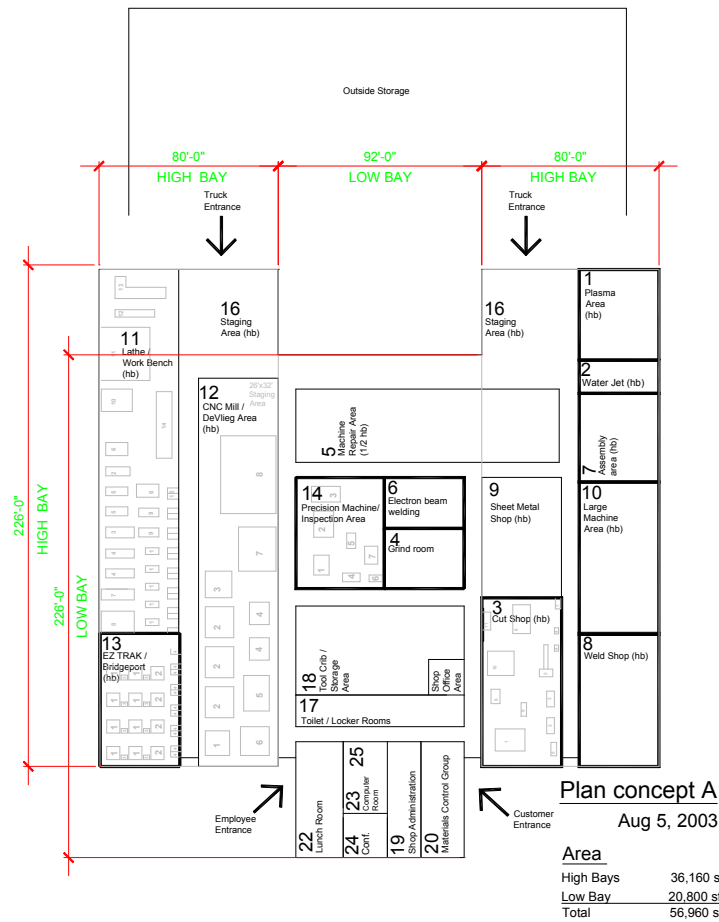
Comparison:

The following chart compares the existing and proposed new facilities.

Advanced Manufacturing facility-New/Existing comparison				
No.	Title	Proposed Area (SF)	Existing Area (SF)	Existing Location
1	Plasma Cutting area	1,100	1,104	Building 179
2	Water Jet Area	540	No current Facility	-New program item
3	Cut Shop	2,750	1,922	Building 179
4	Grinding Area	975	770	Buildings 179 and 180
5	Machine Repair Area	4,400	4,667	Buildings 105, 109 and house A &
6	Electron Beam Welding	850	448	Buildings 179 and 180
7	Assembly Area	720	No current Facility	-New program item
8	Weld Shop	2,160	1,000	Building 179
9	Sheet Metal Shop	1,900	1,311	Building 180
10	Large Machine area	2,800	2,800	Buildings 179 and 182
11	Lathe Area	5,900	4,000	Building no.182 (Wilson Hall)
12	CNC Mill Area	6,300	4,000	Building no.182 (Wilson Hall)
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14	Precision Machining / inspection	1,800	No current Facility	-New program item
15	Truck access	1,000	No current Facility	-New program item
16	Staging Area	1,000	No current Facility	-New program item
17	Toilet/Locker rooms	600	400	Building 182, 109 and house A
18	Tool crib/storage area	3,150	2,710	Building 182
19	Shop office administration	1,000	1,000	House 108
20	Materials control group area	1,500	1,500	Industrial Center building
21	Outside Storage	(13,000)	(7239)	Village West Lot
22	Lunch room	1,025	1,249	House A and Building 106
23	Computer room	360	334	Building 106
24	Conference room	325	143	Building 108
	Subtotal	44,055	32,158	
	Mechanical/circulation/miscellaneous @ 20%	8,811	3,859	Building 179, 180, 182, House A and B
	Total	52,866	36,017	

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New / Existing
Facility
Comparison

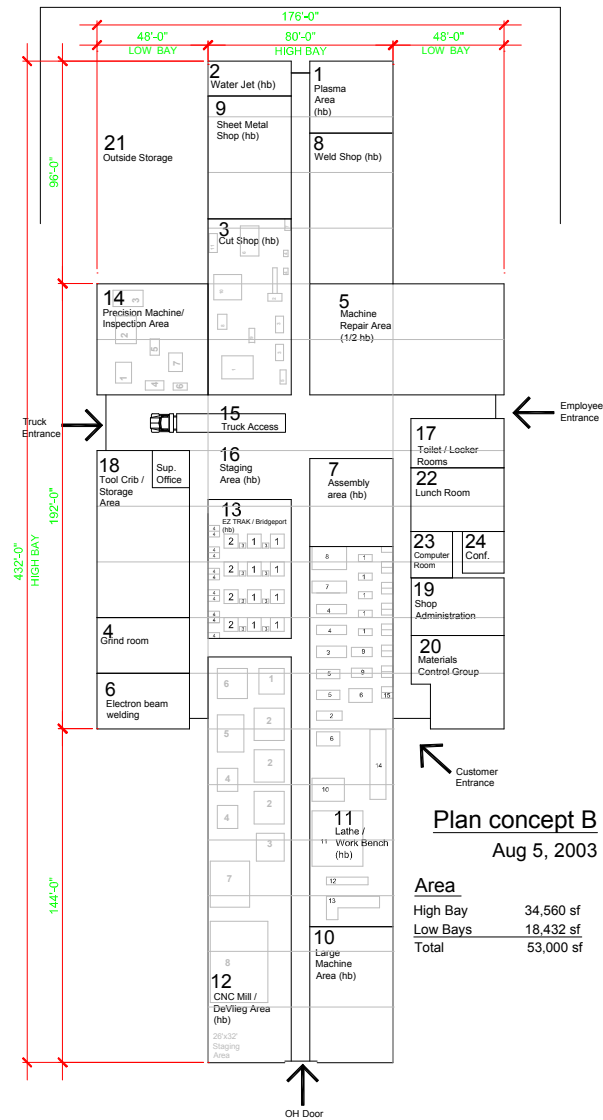


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Schematic Floor Plans

Plan Concept A



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Schematic Floor Plans

Plan Concept B